

REMARKS

This communication is in response to the Office Action mailed on September 28, 2010. Applicant has amended claims 1 and 16 and added new claims 29-31. The Application currently includes claims 1, 6-16, 19-22, 28-31.

Claims 1, 7-10, 16, 20 and 28 were rejected as being anticipated by Pfingston U.S. Patent No. 2,645,954. Applicant respectfully traverses these rejections. Of the rejected claims, claims 1 and 16 are independent claims.

Applicant respectfully submits that Pfingston does not anticipate claims 1 and 16. Elements of claims 1 and 16 include, at least, rollers of a first and second set that are held on a common holder which is rotated about an axis crossing the axis of rotation of the workpiece. There simply is no disclosure of this claim element.

As previously stated, Pfingston discloses a tap for forming internal threads of a tube. The tap comprises pilot rollers 14 and thread forming rollers 15 mounted on drive pins 16 which are mounted in body members 10, 11. The tap is not designed to expand the tube (col. 4, lines 23-27). The pilot rollers 14 iron out any irregularities on the interior tube wall (col. 4, lines 30 – 32). Based on this statement the examiner regards the pilot rollers 14 as a first set of forming rollers.

However, the diameter of the path of the rollers 14 is slightly less than the internal diameter of the tube (col. 4, lines 32-35). The rollers 14 cannot consistently apply pressure to the workpiece when the path of the rollers 14 is less than the diameter of the tube. As such, rollers 14 are not forming rollers, since they only serve to guide the tap and to iron out irregularities and apparently do not serve to change the overall outer shape and appearance of the work piece.

Further, the rollers 15 are regarded by the examiner as a second set of forming rollers. The rollers 15 make an angle with the longitudinal tube axis (col. 3, lines 24 – 29 and col. 4, lines 38 – 44). The examiner regards the body member 10 as a common holder.

According to the present invention, rollers of a first and second set are held on a common holder where the *holder* is rotated about an axis crossing the axis of rotation between the work piece and the tools. In Pfingston, the body member 10 is aligned with the work piece (col. 4, lines

28 – 32) and rotated by drive shaft 23. Hence, body member 10 is rotated about an axis which *coincides* with the rotational work piece axis. For as far as body member 10 can be regarded as a common holder, it does *not* have an axis crossing the longitudinal work piece axis and it is not radially adjusted during operation.

The examiner refers to the lead angle of the rollers 15, however it should be noted that the pilot rollers 14 do not make this angle. The rollers 15 make this angle in order to form a helical thread groove in the work piece (col. 4, lines 38 – 44). This means that the angle is an angle in *tangential* direction relative to the work piece surface. Consequently, the axis of the inclined roller 15 does *not* cross the longitudinal work piece axis. Moreover, the lead angle is an angle of the rollers and *not* an angle of the body member 10 or the rollers 14.

With respect to the statements in the Response to Arguments section of the Office Action, Applicant respectfully submits that the claim recites that the holder be capable of rotation about an axis which crosses said axis of rotation, not the roller itself. As such, an inclined roller does not meet the recited claim element. Further, the holder of Pfingston could not rotate about an axis that cross the axis of rotation as the holder has a circular perimeter that engages a circular interior of a pipe. It would not be possible to rotate the holder of Pfingston at the claimed angle rotation because the tolerance between the holder and the interior of the pipe are sufficiently small as to be able to form threads therein. Further the surface of the pipe would prevent such a configuration from occurring, otherwise the holder would bind within the interior cavity of the pipe.

Consequently Pfingston does not disclose a holder rotated about an axis crossing the operational rotational axis and does not disclose each and every element of claims 1 and 16. Therefore, Pfingston does not anticipate independent claims 1 and 16.

The Office Action rejected claims 1, 7-11, 16, 20, 22 and 28 as being anticipated by Schow U.S. Patent No. 4,055,064. Of the rejected claims, claims 1 and 16 are independent claims. Applicant respectfully traverses these rejections.

Independent claim 1 has been amended to claim that the holder be radially adjustable during the working of the workpiece into a selected shape. Claim 16 has been amended to recite

that the holder radially translates during the forming of the workpiece. Applicant respectfully submits that Schow does not disclose or suggest either of these claim elements.

Schow discloses a muffler and tailpipe expander and cleaner, comprising rollers 30, 32 which are held in segments 12 that can be adjusted radially under the action of wedges 20, 22. Radial adjustment is stopped after the rollers are in engagement with the inner surface of the work piece. Only after that moment the operational rotation is started (col. 3, lines 21 – 28). Accordingly, the wedges are not radially adjusted *during operation*.

Therefore, Schow does not disclose each and every element of claims 1 and 16. Consequently, claims 1 and 16 are novel over Schow.

Claims 1, 6-16, 19-21 and 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Recksiek (DE 3423223) in view of Hoffman et al. U.S. Patent No. 5,845,527. Applicant respectfully traverses this rejection.

Applicant respectfully submits that the structure of Recksiek cannot be modified to allow the stack of rollers to be pivoted. Recksiek discloses a method for manufacturing a product using rollers comprising a series of roller disks having a single axle. The office action refers to holder 1 as a common holder. As pointed out by the examiner Recksiek does not disclose tilting the holder 1.

Hoffmann discloses a method for progressively forming an end portion of a metallic tube. The end portion is heated while a forming member is reciprocated along the end portion. An inductive heating element is moved with the forming member. The examiner refers to pivoting rollers 6 and 8. Means 6 and 8 are carried by a common structure (col. 9, lines 26 – 30). Column 11, lines 49 – 61 disclose that the rollers can be pivoted between two positions (see Figures 15 and 16).

The Examiner states that the intention of Recksiek is to provide a necked or bent tube. The teaching of Hoffman is applied to show that it is known to pivot rollers about an axis and to move them radially for the constricting of a tube end. According to the examiner it would be obvious to provide a pivoting means as disclosed by Hoffmann to the apparatus of Recksiek.

Applicant submits that Recksiek cannot be modified to pivot a stack of rollers having a

common axle, as it would defeat the purpose of Recksiek which is to have the rollers follow the final contour of the work piece. If the stack of rollers were pivoted then, for instance, the lower roller would move inwardly causing the upper roller to move outwardly. This would cause deformation of the workpiece, in the event the rollers were able to rotate about the axis of rotation of the workpiece. Further, it is likely that pivotal movement of the stack of rollers in Recksiek would cause binding with the workpiece and the other two stacks of rollers so that the device would not even function.

A significant difference between Hoffman and Recksiek is that in Hoffman, a single roller is pivoted. There is no disclosure of a second forming roller that is opposite the roller. As such the roller of Hoffman can pivot as there is no other cooperating roller.

Unlike Hoffman, Recksiek discloses three equally spaced apart stacks of rollers where each stack of rollers has a single axle. If one of the sets of rollers was pivoted, it would most likely cause binding between the workpiece and the other stacks of rollers. Tilting the axis of the individual rollers 2 would also result in loss of contact between the some of rollers and the work piece.

The rollers of Recksiek are shaped to engage the work piece simultaneously, at least in the end, and cannot be used for progressively shaping by reciprocating the rollers, as taught by Hoffmann. Further, the workpiece would be deformed because as previously stated Recksiek discloses that object was to have the rollers follow the final contour of the workpiece. This simply would not happen if one of the stacks of rollers were pivoted.

Also, the rollers have extended edges (2k in the drawing) to cover the split between the rollers. This way the rollers tightly match the work piece contour. The extended edges maximize swaging in the section to be shaped. Tilting the holder 1 would disturb the tight match and would result in a situation where only one of the rollers could engage the work piece.

Hence, it is not obvious to combine Hoffmann's teachings with the teachings of Recksiek. As such, Applicant respectfully submits that independent claims 1 and 16 are allowable over the combination of Recksiek and Hoffman.

The Office Action also rejected claims 6-15, 19-22 and 28. Claims 6-15, 19-22 and 28 further define the inventions claimed in claims 1 and 16, respectively. At least due to their dependency upon independent claims 1 and 16, dependent claims 6-15, 19-22 and 28 are believed to be in allowable form.

New claim 29 claims a plurality of rollers on a common holder that moves both radially and pivotally with respect the axis of rotation where the common the first common holder is capable of rotation about an axis which crosses said axis of rotation and/or of radial translation during the formation of the workpiece. Claim 29 also claims a second holder with one or more rollers that moves radially with respect to the axis of rotation. For the reasons stated with the allowability of claims 1 and 16, claim 29 is believed to be in allowable form. Further, Applicant submits that the cited prior art does not disclose a forming machine having one holder that moves both radially and pivotally while a second holder only moves radially. As such, claim 29 is believed to be in allowable form.

Claim 30 recites that each of the rollers are radially positionable independent of the other rollers. Applicant submits that cited prior art does not disclose the claimed structure. Rather each of the stacks of rollers is carried by a common axle. As such all of the rollers move as the axle is moved. There is no disclosure of the claimed independent radial movement of each of the rollers. As such, claim 30 is also believed to be in allowable form.

Claim 31 recites that holder is rotated about an axis which crosses said axis of rotation and/or radially adjusted during operation such that an outer surface of the workpiece is contacted by the first and second set of rollers. Applicant submits that both Pfingston and Schow engage the inner surface of a workpiece and are not capable of forming a workpiece by engaging an outer surface. The combination of Recksiek and Hoffman does not render claim 31 as obvious for the reasons stated with respect to the allowability of claims 1 and 16. Applicant respectfully submits that claim 31 is in allowable form.

The foregoing remarks are intended to assist the Office in examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims;

the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered exhaustive of the facets of the invention which are rendered patentable, being only examples of certain advantageous features and differences, which applicant's attorney chooses to mention at this time. For the foregoing reasons, applicant reserves the right to submit additional evidence showing the distinction between applicant's invention to be unobvious in view of the prior art.

Furthermore, in commenting on the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the same and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims.

For the foregoing reasons, Applicant submits that the present application is in allowable form. Allowance of the present application is respectfully requested.

A three month extension of time is hereby requested for responding to the Office Action. An online charge authorization for the extension of time fee is included herewith.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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